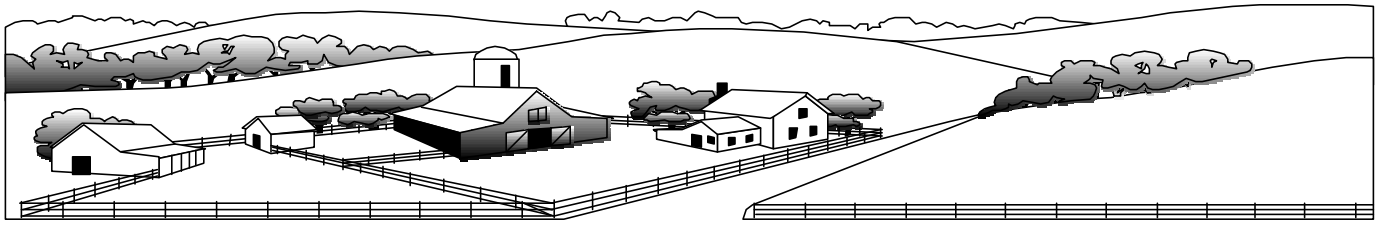
AGRICULTURE



LONG-TERM GOALS (15-YEAR)

Goal 1 - Confined Animal Feeding Operations

Maintain existing beneficial uses in unimpaired state waters and restore beneficial uses in surface waters where confined animal feeding operations are contributing to a water quality impairment caused by sediment, nutrients or pathogens as listed in the 303d TMDL Priority List Report, or where ground water contaminants originating from confined animal feeding operations exceed the state ground water standard, by 2014

Goal 2 - Livestock Grazing

Maintain existing beneficial uses in unimpaired state waters and restore beneficial uses in surface waters where livestock grazing operations are contributing to a water quality impairment caused by sediment, nutrients or pathogens as listed in the 303d TMDL Priority List Report, or where ground water contaminants originating from livestock grazing operations exceed the state ground water standard, by 2014

Goal 3 - Cropland Management (includes field crops, vegetables, orchards and vineyards)

Agricultural cropland will be managed in ways which maintain or restore beneficial uses in surface waters and protect water quality in ground water by controlling losses of sediment to surface waters and losses of nutrients and toxics to ground and surface waters by 2014

Goal 4 -Nursery and Ornamentals Management

Commercial nursery and ornamental operations will be managed in ways which maintain or restore beneficial uses in surface waters and protect water quality in ground water by controlling losses of sediment to surface waters and losses of nutrients and toxics to ground and surface waters by 2014

Goal 5 - Agricultural NPS Program Development

Continue to develop and implement agricultural nonpoint source (NPS) pollution programs to effectively prevent and reduce pollution in ground and surface waters through 2014

INTRODUCTION

Agriculture is a large and diverse industry in Virginia. It accounts for approximately nine million acres (30 per cent) of Virginia's land use. Agricultural land uses include row crop production of grains, forage, peanuts, cotton, tobacco, and vegetables; pasture and hay production necessary for beef and dairy production; as well as facilities for poultry, swine, beef, dairy, and equine operations; orchards; and ornamental nursery operations.

According to the 1998 *303(d) Total Maximum Daily Load Priority List Report*, agricultural nonpoint source pollution is the largest source of pollutants causing non-attainment of designated water uses in monitored segments of Virginia's rivers. The *Virginia Nonpoint Source Pollution Watershed Assessment Report* indicates that the pollution potential is greatest where agricultural activities occur on highly erodible soils, in areas of intensive crop and pasture production and in areas of high livestock and poultry production. Nonpoint source pollutants typically associated with agriculture include nutrients, sediment, pathogens and toxics. These pollutants can escape crop field and livestock production areas and enter surface and ground water systems. This can occur as a result of surface runoff and air deposition. When their levels in water become significant, they can have a negative impact on aquatic life, cause a reduction in dissolved oxygen, clog water treatment system filters and weaken or destroy aquatic vertebrates and invertebrates as well as their habitat. Human use of the water may become affected as a result of excessive plant growth, increased turbidity, and damaged fisheries and wildlife habitat. Nonpoint source pollution associated with agricultural activities can also impact the water quality of ground water supplies, particularly in areas with highly permeable soils or karst topography.

AGENCY ROLES & RESPONSIBILITIES

Department of Conservation and Recreation

The Department of Conservation and Recreation (DCR) coordinates the various statewide agricultural nonpoint source pollution management programs and has been designated as the lead management agency for the development and implementation of Virginia's Nonpoint Source Pollution Management Program. The department will be responsible for the direction and program coordination and for reporting to EPA. In addition to these leadership activities, DCR agricultural programs focus on several areas. The Agricultural Best Management Practices (BMPs) Cost-Share Program is designed to encourage implementation of various agricultural BMPs statewide through cost-sharing of both structural practices and annual practices capable of reducing the loss of sediment, nutrients, toxics, and pathogens to ground and surface waters. DCR also implements the BMP Tax Credit Program and the Precision Nutrient and Pesticide Application Equipment Tax Credit under the guidance of the Virginia Soil and Water Conservation Board. DCR operates the Nutrient Management Program which encourages the proper land application and efficient use of fertilizers, manures, sewage sludges and other nutrient sources in ways which protect water quality. DCR-approved nutrient management plans are a required component of animal waste permits for dairy, swine, beef farms with 300 or more animal units, and for poultry farms with 200 or more animal units. Biosolids use permits are reviewed by nutrient management field staff to identify and manage site-specific nutrient issues. A nutrient management training and certification program is available to encourage private sector participation. The department also manages the nonpoint source pollution component of the Water Quality Improvement Fund, which is utilized for program implementation and to develop a variety of NPS projects.

In addition, as the demand and reliance on groundwater resources increase in agricultural areas undergoing unprecedented residential growth, DCR is cooperating with other agencies to establish a karst groundwater monitoring network in the vicinity of unstudied nonpoint sources, such as land application sites and rural subdivisions.

Department of Environmental Quality

Pursuant to the State Water Control Law, the Department of Environmental Quality (DEQ) is the lead

state water quality agency. DEQ issues permits for numerous agricultural activities in order to control NPS pollution. Virginia Pollution Abatement (VPA) permits are issued for animal feeding operations with 300 or more animal units. Fish farms and hatcheries that have point source discharges to surface waters more than 30 days per year are regulated under a general Virginia Pollutant Discharge Elimination System (VPDES) permit. The main focus of this VPDES permit is control of solids in the wastewater. DEQ also issues permits for ground water withdrawals greater than 300,000 gallons per month, including agricultural withdrawals, in designated ground water withdrawal management areas.

Department of Agriculture and Consumer Services

The Virginia Department of Agriculture and Consumer Services administers several programs that have an impact on non-point source pollution control and management. One such area of major responsibility is the regulation of pesticide use, storage and disposal. By monitoring the application of pesticides on a random basis, conducting routine inspections of pesticide storage facilities and conducting an annual pesticide collection program to provide growers with a means to safely dispose of unwanted, outdated and banned pesticides, VDACS strives to insure that pesticides are handled safely and that the opportunity for environmental damage by pesticides is significantly reduced. In addition, VDACS conducts a plastic pesticide container recycling program, insures that applicators of Restricted Use Pesticides (RUPs) are properly certified, and that all pesticides are used and handled according to label directions; and works with the U.S. Department of Agriculture to insure that growers maintain adequate records of their RUP applications. In the program area dealing with site-specific water quality concerns, the Commissioner of Agriculture and Consumer Services administers the requirements of the Agricultural Stewardship Act.

Chesapeake Bay Local Assistance Department

The Chesapeake Bay Local Assistance Department (CBLAD) is responsible for the Virginia Chesapeake Bay Preservation Act (CBPA – §10.1-2100 et seq., *Code of Virginia*) and for administering Chesapeake Bay Preservation Area Designation and Management Regulations (9 VAC 10-20-10) promulgated thereunder. CBLAD provides technical assistance, financial assistance, regulatory interpretations and programmatic guidance to local government officials, landowners, cooperating agencies, and all other interested parties regarding the agricultural criteria of the CBPA regulations and local ordinances. Site-specific resource management evaluations are conducted on agricultural parcels located within locally designated Chesapeake Bay Preservation Areas. These evaluations include fields that adjoin surface waters in 29 eastern Virginia counties and several cities.

Virginia Department of Health

The Virginia Department of Health (VDH) oversees the implementation of the Biosolids Use Regulations (12 VAC 5-585) promulgated by the State Board of Health. The regulations and adopted standards govern the land application, distribution or marketing of biosolids. Approximately one-half million wet tons of biosolids are applied to nearly 25,000 acres annually at specified agronomic rates. Roughly one-half of the applied biosolids originate from sources outside of Virginia. When a treatment works owner assigns responsibility for off-site biosolids use operations to a private contractor, a VDH permit is issued to that contractor.

Virginia Department of Forestry

The Department of Forestry (DOF) has served as lead in the governor's effort to develop the *Commonwealth of Virginia Riparian Buffer Implementation Plan.* DOF provides staff support to the Virginia Riparian Buffer Work Group, which is charged with implementing the plan. The multi-agency Riparian Buffer Work Group, appointed by the Secretary of Natural Resources, is responsible for implementation of set strategies to achieve the plan's objectives. The plan outlines six objectives and subsequent strategies to support the Virginia commitment to restore 610 miles of riparian forested buffers within the Chesapeake Bay watershed. In addition, at least 300 additional miles of restoration are sought in the Southern Rivers watersheds of the state. The objectives of the Riparian Buffer Implementation Plan are to:

- restore missing or inadequate buffers;

- conserve existing riparian buffers;
- enhance program coordination and accountability;
- enhance incentives; promote education and outreach; and,
- target, track and conduct research.

USDA-Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) provides both technical and financial assistance to producers to plan and implement conservation practices to address nonpoint source pollution and to improve water quality. NRCS maintains a network of field offices and regional technical assistance centers across the state to provide staff resources to work with local soil and water conservation districts, administer USDA programs and provide direct one-on-one assistance to producers. The NRCS framework of assistance is based on providing a conservation plan to address the resource needs and problems as well as the producers objectives. Additional technical assistance is then provided to implement and install the conservation practices planned. Financial assistance is often available under several programs (federal and state) to provide financial incentives to the producers.

NRCS also provides technical assistance to a variety of users in other natural resources related issues such as soil survey, Small Watershed Protection projects under Public Law 534 and Public Law 566 legislation, Emergency Watershed Protection in times of disaster, and the Resource Conservation and Development Program to assist sponsoring local units of government with resource based assistance.

USDA - Farm Service Agency

The Farm Service Agency (FSA) administers Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), Emergency Conservation Program (ECP) and with NRCS, Environmental Quality Incentives Program (EQIP). With these programs FSA assists producers with implementing conservation practices to address NPS pollution and to improve water quality. FSA maintains a network of county offices (currently being co-located with other USDA programs) and provide one-on-one assistance to producers. Cost-share assistance is offered with EQIP (5 year contracts) and CRP (10-15 year contracts) to encourage the implementation of various agricultural practices that will reduce NPS pollution from nutrients, pesticides, sediment and will enhance wildlife. Some technical assistance is provided by FSA, but the majority is provided by NRCS. Other state and local agencies also provide financial assistance incentives to producers to implement these needed conservation practices. FSA and the state are working on a Conservation Reserve Enhancement Program which is slated to begin in 1999, and the conservation practices will address non-point source pollution and water quality in targeted areas in both the Southern Rivers watershed and Chesapeake Bay drainage.

FSA also administers the Emergency Conservation Program which provides cost-share assistance to eligible agricultural producers to rehabilitate farmlands and conservation facilities due to a natural disaster or severe drought.

Soil and Water Conservation Districts

Virginia's 46 soil and water conservation districts (SWCDs) are close partners with DCR in providing NPS pollution programs to their localities and have also begun to tackle difficult groundwater and planning issues in their areas. For example, many SWCDs in western Virginia have cooperated directly in karst resource protection projects with DCR's Natural Heritage Program, the Tennessee Valley Authority, and the US Fish & Wildlife Service. The SWCDs, who are self-governed political subdivisions of the state, help coordinate the many local, state and federal nonpoint initiatives designed to protect and enhance water quality. They are run by a locally elected board who sets priorities, and guides and directs the work of district personnel. Advisory, not regulatory in nature, districts provide assistance to local landowners in implementing Virginia's agricultural Best Management Practices on their land. They administer Virginia's Cost Share Program for the installation of BMPs, working with landowners to ensure that these practices are correctly installed and maintained, and follow up with "spot

checks" to see that the practices function properly.

In the tidewater region of the Chesapeake Bay watershed, the agricultural provisions of the Chesapeake Bay Preservation Act are administered as a cooperative effort between the SWCD and CBLAD, who provide personnel funding, training, and program guidance to the local soil and water conservation district. Districts also work closely with VDACS, becoming involved when an Agricultural Stewardship Complaint is lodged against a local agricultural operation. The district may choose to be involved in the investigation of the complaint or may opt to let VDACS handle this independently. However, if a complaint is considered valid, the SWCD will become involved to help the violator solve the water quality problems by providing whatever technical assistance is needed to install BMPs. The violator must ultimately have a Conservation Plan, which addresses the water quality problems, approved by the SWCD board.

Using a watershed approach, the districts in the bay region have been helping coordinate planning nutrient management reductions in the various tributaries that enter the bay. Many SWCDs have received EPA 319 grants to enable them to carry out some of this work as well as Virginia General Assembly funds, administered by DCR, which they have used in partnership with other SWCDs who share common watershed boundaries. These funds have produced joint projects with demonstrable reductions in nutrients, and mark the first time that districts have worked across their own political boundaries. Educational programs presented by districts have reached a great number of citizens, who otherwise would not make any connection between their activities and the resulting water quality impacts. These programs have involved many partners, including DCR, DEQ, VDACS, CBLAD, NRCS and the Cave Conservancy of Virginia (CCV).

Virginia Cooperative Extension Service

Virginia Cooperative Extension (VCE) is the outreach arm of Virginia's two land grant universities – Virginia Polytechnic Institute and State University (VPI&SU) and Virginia State University. Through local and area extension agents and with the support of university extension specialists, VCE provides educational programs and assistance to landowners, land managers, and farmers. VCE provides a major educational role in Virginia's water quality efforts dealing with agriculture. Agents and specialists work with farmers to implement BMP's that are economically viable with the farming operation. Through outreach educational efforts in the form of field days, workshops, tours, seminars, one-on-one and other outreach methods, Extension agents coordinate educational outreach efforts with other state and federal partners who are involved in the NPS pollution control effort.

Through extension specialists, VCE can also respond to nonpoint questions or concerns with applied research that is applicable to farming operations in all parts of Virginia. Once the on-farm research is complete, conservation partners can then incorporate the information collected into nonpoint programs that are applicable and that are based on sound scientific information that has been provided through the efforts of VCE.

Finally, VCE is unique in that its programs are linked to local, state and the federal government. Because of VCE linkages to all three government entities, it is able to muster resources from any of the three, and to use these resources to help implement relevant nonpoint programs in coordination and in cooperation with other state and federal agencies.

Virginia Polytechnic Institute and State University

As one of the two land grant universities in Virginia, the Virginia Polytechnic Institute and State University (VPI&SU) mission focuses on teaching, research and extension/public outreach. Through its College of Agriculture, the university focuses its efforts on a comprehensive educational program for undergraduates and graduates who will be prepared to work on current issues affecting the Commonwealth of Virginia. With NPS pollution being a major initiative nationwide, the graduates of the College of Agriculture who focus their fields of studies on nonpoint source pollution issues are well qualified to join the work force in this expanding field of work.

The university also is one of the leading research institutions in the country. The departments of Crop, Soils, and Environmental Sciences, Biological Systems Engineering, Dairy Science, Animal and Poultry

Science, Entomology and others have comprehensive research programs that focus on current NPS pollution issues of the day. Manure management, waste management, nutrient management and integrated pest management (IPM) are just a few of the issues that these departments are currently conducting research in.

It is through VCE that the implementation of the research comes into play. VCE, through its presence in almost all localities in Virginia, is able to work in concert with state and local government to implement educational programs based on this sound scientific research. In sum, through its teaching, research and extension programs, VPI&SU is able to partner with other state and federal agencies on a multitude of NPS pollution initiatives.

Virginia State University

Virginia State University (VSU) is the other land grant universities in Virginia. Its mission is to promote and sustain academic programs that integrate instruction, research, and extension/public service in a design cost responsive to the needs and endeavors of individuals and groups within its scope of influence. The University provides bachelors degrees in many areas and master's degrees in selected areas. Its overall goals are:

- to foster intellectual and personal development of students;
- to provide a well-rounded liberal arts education;
- to develop in students the mastery of fundamental knowledge in various academic areas of their choice; and,
- to prepare students for furthering their studies at the graduate level by providing them knowledge skills, and abilities.

The university has a strong agricultural research program in the areas of nutrient management, pesticides, horticulture, crops, meat-goat, and aquaculture. Except for aquaculture research, which is operated by the university's Virginia Cooperative Extension scientists, the rest of the program is managed by the Agricultural Research Services (ARS), an independent department within the School of Agriculture, Science and Technology. It functions under a separate director and operates closely with Extension to distribute research results to stakeholders throughout the commonwealth. Research in the environmental field includes land application of confined animal manure, with special emphasis on nitrogen and phosphorus mobility, atrazine sorption and fate in agricultural soils and tidal river sediments; wetlands and riparian buffer establishment; and development of BMPs for nutrients, pesticides and land application of confined animal manure.

CONSERVATION PARTNERSHIPS AND NON-GOVERNMENTAL ORGANIZATIONS

Non-governmental organizations such as the Virginia Dairymen's Association, the Chesapeake Bay Foundation, the Virginia Poultry Federation, the Virginia Agribusiness Council, and the Virginia Farm Bureau Federation have periodically volunteered to promote agricultural NPS practices and efforts in newsletters and other mailings, at farmer meetings, on radio programs and other outreach efforts. Other active participants include the Virginia Crop Production Association which routinely includes nutrient management and pesticide management concepts in educational meetings, and the various farm equipment dealers who have distributed information to producers on tax credit incentives for improved nutrient and pesticide application equipment. Agricultural chemical manufacturers encourage the sale of pesticides in returnable closed delivery systems by offering incentives to purchase equipment needed to utilize the closed system. Various activities of nongovernmental organizations, which support NPS pollution reduction such as those described previously, are expected to continue into the future.

ISSUE IDENTIFICATION &

PROGRAM ASSESSMENT

Nutrients

Major sources of nutrients used in agriculture include commercial fertilizers, manures, sewage sludges, industrial wastes, and legume atmospheric fixation. Nutrients such as nitrogen and phosphorus are necessary for sustainable agricultural production systems. When lost to the environment, nutrients are of concern in both ground and surface waters. In ground water, the primary nutrient of concern is the nitrate form of nitrogen. Excessive nutrients in groundwater that provides base flow to a surface water body may reduce the overall assimilative capacity of the stream. High nitrate levels in drinking water may cause adverse health effects in human infants and in certain livestock. Ground water is also a major contributor to surface water flow and can thereby contribute nitrate to surface waters. Due to the negative charge of the nitrate ion and its relatively high solubility in water, this form can leach rapidly through certain soils. This leaching is most problematic in permeable sandy soils of the coastal plain and karst topographic areas of the ridge and valley regions where shallow soils exist over fractured bedrock. These areas of the state have experienced instances of ground water nitrate-nitrogen levels above the EPA drinking water standard of 10 ppm as documented in several well testing studies. In surface waters, both nitrogen and phosphorus can negatively impact water quality by stimulating algal growth. This can lead to low levels of dissolved oxygen, thereby stressing aquatic organisms. Another impact of excessive algal growth is increased water treatment costs at intake points. Additionally, high levels of nutrients in the Chesapeake Bay have caused a reduction in the acreage of submerged aquatic grass beds due to phytoplankton stimulation and subsequent reduction in light transmitted to these shallow water plants. In fresh water aquatic systems, the concentration of phosphorus is frequently limited relative to nitrogen and thus phosphorus controls the degree of algae growth. In marine environments either nutrient may limit algae growth depending on the season.

Sediment

Agricultural land uses which may generate sediment losses to surface waters include cropland, pasture land, feedlots and farm roads. Sediments are primarily an issue in surface waters, but can seriously impact groundwater quality in karst areas. . Fine textured clay particles can decrease light transmission to beneficial submerged aquatic vegetation in marine environments and can contain significant amounts of adhered nutrients. Coarse particulates do not contain attached nutrients but may cause sediment deposition problems in streams and lakes. Clay particles can remain suspended in water for long periods and may move considerable distance before deposition occurs. All areas of the state can be impacted by sediment loss, although erosion rates do vary considerably by soil texture and topography. Sustained soil erosion from agricultural fields can also reduce long term crop productivity potential.

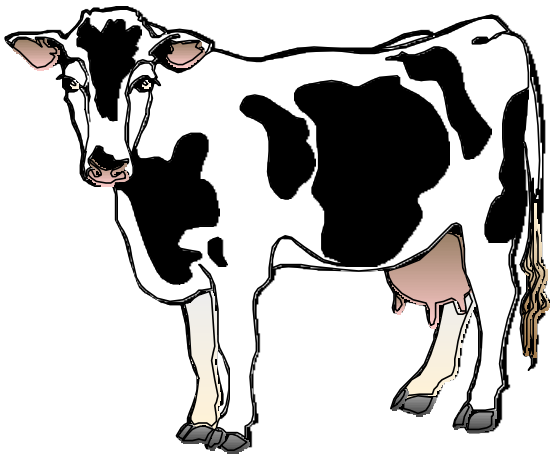
Toxics

Toxics involved in agricultural production systems include pesticide (insecticides, fungicides, herbicides), storage, and disposal; land application of sewage sludge which can contain heavy metals; and land application of industrial sludges. The sludge toxics are not caused by agricultural activities, but rather are a result of society's use of agricultural systems to beneficially utilize or dispose of these outputs. Highly water soluble toxics can be leached to ground water or be carried to surface waters in rainwater or irrigation runoff. Other toxic compounds that are relatively water insoluble can be carried to surface waters with eroded sediment, often attached to clay particles. Pesticide degradation rates in soils impact the loss potential. Wide scale contamination of ground or surface waters by any of the various toxics associated with agriculture is not believed to be evident in Virginia, however, proposed groundwater monitoring efforts in the Shenandoah River watershed may further clarify the risks associated with toxics issues. Misuse or mismanagement of land-applied toxics could create very localized water quality concerns.

Pathogens

Pathogens are disease causing organisms such as bacteria, viruses and protozoa. Potential agricultural

sources of these microorganisms include storage and land application of livestock wastes, livestock stream access points, storage and land application of municipal sewage sludge, and disposal of animal mortalities. Pathogens in water can cause illness in humans and other animals through consumption or contact. Contamination of ground water supplies is relatively unlikely except in areas with extremely permeable soils or areas with very prominent karst topography. Surface water contamination is more likely. Waste treatment processes generally reduce the levels of pathogens in waste. Following land application, exposure to environmental factors such as desiccation, ultraviolet light or contact time with soil microbes will reduce the potential for runoff of pathogens.



SOURCE CATEGORIES

Significant agricultural production sectors in Virginia and the potential pollutants most relevant to each is summarized in the following matrix table:

SOURCE SECTOR CATEGORY	POLLUTANT CATEGORY			
	SEDIMENT	NUTRIENTS	TOXICS	PATHOGENS
Confined Animal Feeding Operations	**T**	**T**		**T**
Livestock Grazing	**T**	**T**		**T**
Field Crops	**T**	**T**	**T**	
Vegetables	**T**	**T**	**T**	
Orchards and Vineyards			**T**	
Nurseries and Ornamentals	**T**	**T**	**T**	

Confined Animal Feeding Operations

Confined animal feeding operations (CAFO) include farms raising dairy cattle, beef cattle, hogs and poultry held in unvegetated lots or indoor production facilities for the equivalent of 45 days per year or more. This definition pertains to both operations that require a permit and non-permitted operations. According to the 1997 Census of Agriculture, Virginia has 121,823 milk cows on 1,671 farms, with 110 of these farms having 300 or more animal units and a total of 32,440 cows (26.6 per cent of total state milk cow numbers). The state has 1,639,058 beef cattle and calves located on 26,547 farms, however, confined feedlots likely only house about 2 per cent of these cattle. Hogs and pigs are raised on 1,170 farms with total inventory of 385,755 animals, with greater than 90 per cent of total statewide animals being produced on 79 farms. Virginia has 2,744 poultry farms which produce primarily chickens,

turkeys or eggs. Sediment runoff can result from unpaved confinement lots and other temporary holding areas on confined dairy and beef farms. Nutrients may be lost to ground or surface waters due to improperly stored or land-applied manure. Pathogen impacts to waters may occur due to direct runoff of animal wastes.

Livestock Grazing

Livestock grazing operations include beef cattle, dairy cattle, horse, sheep and other farms. The state has 1,639,058 beef cattle and calves located on 26,547 farms, almost all of which are grazing operations. Virginia also produces 117,714 sheep and lambs on 1,727 farms. Horses number 43,977 on 7,083 farms. Sediment loss can occur from poorly managed and overgrazed pastures; travel lanes; grazed stream banks; and any feeding, watering, or shady location where the animals may periodically congregate. Nutrient loss is primarily related to uneven distribution of deposited animal feces and urine in pastures, direct manure runoff potential in overgrazed pastures or direct deposition in surface waters at stream access points. Pathogens, primarily coliforms, may be contributed to surface waters due to direct manure runoff potential in overgrazed pastures, or direct deposition in surface waters at stream access points.

Field Crops

Field crops include corn, soybeans, small grains, cotton, peanuts, tobacco, sorghum, hay, and similar crops. A total of 2,532,000 acres of these crops were planted in Virginia in 1997. Gully, rill and sheet erosion are the primary sediment contributors. Much of the potential for sediment contribution to surface waters is from fields classified as "highly erodible land." Nutrients may be lost to ground or surface waters due to over application or improper timing of fertilizer, manure or sludge applications. Potential toxic sources include herbicides, insecticides and fungicides.

Vegetables

Vegetable operations produce primarily tomatoes, snap beans, cabbage, sweet corn, cucumbers and bell peppers on approximately 21,700 acres. Sediment, nutrient, and toxic loss potential per acre from production fields is likely higher than for field crops due to a greater reliance on clean tillage, use of plastic mulch, greater use of irrigation, high market value as compared to fertilizer costs, and greater use of crop protection materials.

Orchards and Vineyards

Orchards and vineyards comprise 30,552 and 1,827 acres respectively in the state. Sediment and nutrient loss potential is believed to be limited due to a long cropping period after establishment, limited soil tillage area and relatively low nutrient application rates. Toxics used in production are primarily insecticides and fungicides.

Nurseries and Ornamentals

Nurseries and ornamentals include field-grown nursery stock, container nurseries, greenhouses and sod production. Approximately 1,019 such farm operations exist in Virginia. These operations have potential to contribute sediment from bare ground and from irrigation or rainwater runoff. Container nurseries and greenhouses may contribute nutrients to ground or surface waters due to a high plant value-to-fertilizer expense ratio; significant irrigation applications, which sometimes contain injected fertilizers; the use of plastic mulches or site modification techniques to encourage infiltration of excess water such as gravel or filter cloth ground covers.

Assessment of Nonpoint Source Pollution Programs

Agricultural BMP Cost-Share Program - DCR, SWCDs

This program provides financial incentives statewide to agricultural landowners and operators for the implementation of approved BMPs, which improve water quality, on crop and pasture lands and animal feeding operations which improve water quality. Eligible practices include animal waste storage structures, cereal grain cover crops, animal mortality composters

and a number of others. The program allows for a maximum cost-share rate of 75 per cent of specific practices and a payment limit of $50,000 annually per participant. The producer must have a conservation plan prior to approval of cost-share funds, and nutrient management plans are required for certain practices. This program is administered at the local level by soil and water conservation districts.

Agricultural BMP Tax Credit Program - DCR, SWCDs (§58.1-339.2 and §58.1-439.4 *Code of Virginia*)

This incentive program provides for a 25 per cent state income tax credit up to $17,500 annually to encourage farmers to install eligible BMPs. To qualify, the BMP must be listed in and comply with the specifications contained in the Virginia Agricultural BMP Manual. In addition, the practice installation must be approved by the local soil and water conservation district.

Agricultural Stewardship Act - VDACS, SWCDs (§10.1-559.1 et. seq. *Code of Virginia*)

This regulatory program allows for enforcement of a number of agricultural BMPs. The Commissioner of Agriculture and Consumer Services will accept any complaint alleging water pollution from an agricultural activity. Within the jurisdiction of the Agricultural Stewardship Act, complaints of this nature are investigated to determine if the agricultural activity is causing or will cause pollution. If the pollution is a threat to Virginia's environment, the Commissioner will require that preventive measures be taken. VDACS, in cooperation with local SWCDs, administers this program, assisted by DCR, DEQ and VCE.

Animal Disease Control and Prevention - VDACS

This regulatory program administers specific animal disease control programs, usually as a cooperative effort with the USDA. Certain diseases, such as tuberculosis, can be transmitted from one species of animal to another and from animals to humans. Some of these "inter-species" pathogens are water- or fluid-borne, while others are airborne. Professional and technical assistance is provided to livestock owners regarding measures to control these diseases. Vaccination of animals for specific diseases, such as brucellosis, are promoted to prevent disease. However, once disease has been disclosed, VDACS initiates action to separate infected animals and supervises the cleaning and disinfection of the areas and facilities in which the diseased animals have been in contact.

Biosolids Use Regulations - VDH (§32.1-164.5 *Code of Virginia*, 12 VAC 5-585-10 et. seq.)

These regulations and adopted standards govern the land application, distribution or marketing of biosolids. When a treatment works owner assigns responsibility for off-site biosolids use operations to a private contractor, a VDH permit is issued to that contractor. As defined by the Virginia Regulations, biosolids means a sewage sludge that has received an established treatment for a required level of pathogen control, has been treated or managed to reduce vector attraction to a specified level and contains acceptable levels of pollutants in accordance with an issued permit. The health department works with a Biosolids Use Regulation advisory committee composed of cooperating agency personnel, land grant university staff, application contractors, treatment plant owners and other interested parties to assist in refining the regulations and guidance documents. The regulations and permits issued control the rate of application based on nutrient content of the biosolids. Permits also contain site-specific management practices to reduce the risk of nutrient and pathogen loss from application sites.

Chesapeake Bay Preservation Act - CBLAD, SWCDs - (§10.1-2100 et. seq. *Code of Virginia*, 9 VAC 10-20-10 et. seq.)

This regulatory program requires landowners in 29 eastern Virginia counties and several cities to maintain 100 foot wide permanently vegetated buffers. These buffers may be modified to 25 feet or 50 feet if the combination of the reduced buffer and the BMPs that are implemented on the adjoining fields are deemed to achieve water quality protection, pollutant removal and water resource conservation at least the equivalent of the 100 foot buffer area. These buffers are to be established where they do not exist, and maintained to protect water quality by filtering NPS pollution runoff from agricultural operations. Agricultural lands that are

adjacent to or within Resource Protections Areas (the water resource plus the 100 foot wide buffer) are given a higher priority for undergoing a site specific resource evaluation. Those evaluations are performed by soil and water conservation district staff funded by CBLAD and are performed on a field-by-field basis. Evaluations include: verification of the existence of any required vegetated buffer; an evaluation of the potential for erosion and an analysis of the nutrient loadings and methods that are applied to the land. Staff, in coordination with NRCS and DCR, then recommends the implementation of necessary or appropriate erosion control, nutrient management or pest management BMPs to farm operators and landowners to reduce soil loss and protect water quality.

Conservation Reserve Program (CRP) - NRCS

This is a voluntary program that offers annual rental payments, incentive payments for certain activities and cost-share assistance to establish approved conservation cover on eligible cropland. The program encourages farmers to plant long-term resource conserving cover to improve soil, water and wildlife resources. Contract periods are from 10 to 15 years.

Environmental Quality Incentives Program (EQIP) - NRCS

This program was established in the 1996 Farm Bill, the Federal Agriculture Improvement and Reform Act of 1996 (PL104-127). It is a voluntary program that provides technical, financial and educational assistance primarily in designated priority areas. Half of the assistance is to be targeted to livestock related natural resource concerns and the remainder to other significant conservation priorities. Priority areas are selected by NRCS for specific areas within the state based on recommendations from the State Technical Committee. All EQIP activities must be carried out according to a Conservation Plan. Conservation Plans are developed by the producer in cooperation with NRCS or other service plans that are site-specific and identify the primary natural resource concerns and the treatment agreed to by the farmer. All practices applied must meet NRCS Field Office Technical Guide standards. EQIP funding is offered to producers through 5 to 10 year contracts based on the producer's Conservation Plan. When producers apply for a contract the NRCS conducts an evaluation of the cost and the expected environmental benefits. Contracts are awarded on the greatest expected benefits for the least expenditure. A producer may elect to receive less than the total amount in order to improve the chances of being accepted. Conservation practices can be cost shared up to 75 per cent of the total cost of installing the practice.

Farm*A*Syst -VCE

Virginia Cooperative Extension, with NRCS, coordinates the Farm*A*Syst program. A number of state and federal agency field staff have been trained on how to implement this program. Farm*A*Syst is an intensive one-to-one educational program that focuses on an on-farm assessment of potential environmental hazards on the farmstead. Once the hazards are identified, corrections to these hazards can be made by the farm family as warranted. Because of the intensive nature of the program, just a few farms have gone through the Farm*A*Syst assessment at this time.

Food Security Act / Conservation Compliance - NRCS, FSA

In order to remain eligible for USDA program benefits, farmers must stay in compliance with an NRCS approved Food Security Act Conservation Plan. Program benefits include federally subsidized crop insurance, price support payments, and disaster assistance.

Ground water Withdrawal Regulations - DEQ
(§62..1-261 et. seq. *Code of Virginia*, 9 VAC 25-600 et. seq., 9VAC25-620 et. seq.)

Ground water withdrawal permits are required for any entity withdrawing 300,000 gallons or more during any month, including agricultural withdrawals, in designated state ground water management areas. While these regulations do not specifically address NPS concerns, water conservation and management plans are required when ground water withdrawal permits are issued for new or expanding uses. Plans must include

requirements for the use of water saving plumbing and processes, an evaluation of water reuse options, a water education program, a water loss reduction program, and mandatory reductions during water shortage emergencies. These requirements will be placed on existing withdrawals at the end of the current 10-year permit term. Two ground water withdrawal management areas have been designated which include the cities of Chesapeake, Franklin, Hopewell, Norfolk, Portsmouth, Suffolk, Virginia Beach, Hampton, Newport News, Poquoson, Williamsburg, and the counties of Accomack, Isle of Wight, Northampton, Prince George, Southampton, Surry, Sussex, Charles City, James City, King William, New Kent, York, and the portions east of Interstate 95 in Chesterfield, Hanover and Henrico counties. Surface water management areas are under consideration but would only place limits on withdrawals during periods of drought.

Integrated Pest Management (IPM) Implementation - VCE

Virginia Cooperative Extension has an extensive Integrated Pest Management (IPM) program implemented in Virginia. Education based on sound research is the cornerstone of a successful IPM program. Through ongoing research on pest economic thresholds in the many crops in the state, VCE is able to provide the latest technical information to farmers that allows them to make educated decisions regarding the pest control methods on their land. In a recent survey of farmers in Virginia it was determined that more than 80 per cent of the farmers surveyed are incorporating IPM tools in their pest management strategies.

Irrigation Water Management -VCE

Virginia Cooperative Extension coordinates a state-wide irrigation educational program for agricultural irrigators throughout the commonwealth. BMPs for irrigators are an important component of this educational program. Over the next two years, VCE will lead an educational effort through a series of workshops that will target all agricultural irrigators in the Virginia Coastal Plain. The purpose of these workshops is to work with irrigation managers on managing their programs in such ways as to minimize its impact on water quality.

Land Use Assessment - VDACS (§58.1-3234 *Code of Virginia*)

The Virginia Land Use Assessment law allows for local ordinances that provide landowners a special assessment tax rate for the preservation of agricultural, horticultural, forest or open space lands. To qualify for agricultural or horticultural use, landowners must certify that the land in question is being used in a planned program of soil management and soil conservation practices.

Noxious Pest Prevention - VDACS

Certain types of pests are very hard to control, and if they become established in a state, the amount of pesticides used in trying to control them tends to increase significantly. The Virginia Pest Law is intended to keep certain plant pests, such as gypsy moth, fire ant and brown snail from entering or expanding their populations in the commonwealth due to their highly noxious nature. For pests not yet established in Virginia, the program contains emergency response activities. VDACS enforces this regulatory program, often with educational and reporting assistance from VCE.

Nursery Inspection Program - VDACS (§3.1-188.32 to 3.1-188.49 *Code of Virginia*)

Under the Plants and Plant Products Inspection Law, each nursery in Virginia is subject to an inspection for plant pests at least annually during which all evident pests in the nursery's stock as well as the level of infestation is noted. Treatment is either recommended or required based on the degree of infestation. IPM is utilized to the extent practicable and is required by product labeling. This program has the effect of reducing the amount of pesticides used in nurseries and fosters the use of IPM. VDACS enforces this law and all of its pesticide application recommendations and requirements are based on the encyclopedic *Pest Management Guide* published by Virginia Cooperative Extension.

Nutrient Management Program - DCR

The nutrient management program's goal is to encourage the proper land application and efficient use of fertilizers, manures, sewage sludges, and other nutrient sources utilized for agricultural and urban purposes, in order to protect and improve the quality of Virginia's ground and surface waters. The program utilizes nutrient management field specialists located statewide and program management personnel to develop or review voluntary, incentive based or regulatory nutrient management plans, conduct educational programs for farmers, demonstrate nutrient management techniques, and assist farmers in soil nitrate testing, manure testing, and nutrient applicator calibration. Program staff are responsible for review and approval of nutrient management plans for VPA and poultry waste permits, and provide technical comments to VDH staff on biosolids use permits.

Nutrient Management Training and Certification Program - DCR (§10.1-104.2 *Code of Virginia*, 4 VAC 5-15-10 et. seq.)

This voluntary program is operated to provide training and certify the competence of persons who prepare nutrient management plans. To be eligible for certification, an individual must meet education and experience requirements, achieve a passing score on both a core and practical examination and maintain the required continuing education requirements. Certified individuals who develop nutrient management plans are required to develop plans consistent with promulgated technical criteria and must provide summary reports to DCR annually. A random sample of the plans prepared by each certified nutrient management planner is reviewed by the department annually for compliance. Certificates may be revoked if plans do not meet the criteria contained in the Nutrient Management Training and Certification Regulations (4 VAC-5-15-10 et. seq.)

Nonpoint Source Pollution Education - VCE

Virginia Cooperative Extension, through area extension agents, provides educational information to farmers and landowners through workshops, field days, demonstrations, tours, newsletters and one-on -one contacts. Agents often coordinate their efforts with staffs from cooperating agencies. These educational events focus on current, local nonpoint issues of concern.

Nonpoint Source Pollution Research - VPI&SU

Faculty at VPI&SU work in a coordinated effort with DCR and other agencies to conduct applied research as needed to address nonpoint source pollutant risk factors. This research helps by developing new and improved ways of managing production systems that will have less potential to pollute surface and ground water. As the results from applied research occurs, information is transferred to farmers through extension agents in the field. In the past, this type of research has led to important new tools for the farmer including nitrogen soil testing methods, the Virginia Land Use Evaluation system, the NutMan computer program for nutrient management planning and others.

Nonpoint Source Pollution Research - VSU

Research being conducted at VSU's Randolph Farm includes wetland establishment, nutrient management and pesticide runoff abatement. A wetland site has been built next to the Virginia Cooperative Extension Pavilion at the farm for demonstration purposes. Selected grass species are being grown in the vicinity of the wetland for nutrient and pesticide entrapment demonstrations. Switch grass (*Panicum virgatum L.*) is being used at the wetland site and in the green house for the entrapment of pesticides from agricultural runoff. Scientists at VSU are engaged in evaluating the effectiveness of vegetative filter strips to retard atrazine runoff from agricultural soils. They are also determining the fate of such pesticides once they have moved off-site into the sediment/water system. Nutrient management research was initiated by in-house support through the USDA-Evans Allen program. The focus of the research is to evaluate sources of nitrogen and phosphorus from land application of confined animal manures and biosolids. The goal is to attenuate nitrogen and phosphorus mobility in manure-amended morphologically diverse mid-Atlantic soils. The entrapment of nutrients in manure-amended soils is also being evaluated using environmentally friendly agricultural and non-agricultural chemicals. The overall goal of the NPS and pesticide research programs at VSU's Randolph Farm are to generate BMPs for safe

and profitable application of manure and pesticides on agricultural land.

Pesticide Applicator Certification - VDACS, VCE
(§3.1-249.52 *Code of Virginia*)

The mishandling of chemical pesticides because of a lack of knowledge about their proper use could lead to unnecessary threats to human health, animal health and the environment. To reduce the risk of unnecessary and potentially tragic accidents, both federal and state law require the users of the more potent pesticides to pass a certification test in order to use those pesticides. In addition, some types of applications, such as those by pest control companies, require certification - regardless of the potency of the product - to protect the general public. VDACS enforces these requirements, and VCE develops educational programs and materials.

Pesticide Clean Days - VDACS, VCE

VDACS and VCE support an ongoing program to collect unwanted pesticides for disposal in facilities designed and licensed to handle hazardous waste properly. This program reduces the quantity of potential toxic pollutants within the commonwealth. More than 639,800 pounds of unwanted pesticides have been disposed of since this voluntary program began in 1990. This service has been provided to all of Virginia's counties and cities. VDACS and VCE are the lead agencies in making this happen annually, often with support from DCR and DEQ.

Pesticide Container Recycling - VDACS, VCE

VDACS conducts a voluntary plastic pesticide container recycling program that collects empty containers from growers and commercial agricultural users for processing into useful items (e.g. plastic shipping pallets), thus preventing another possible source of environmental pollution.

Pesticide Record Keeping - VDACS, VCE

Certain regulations require the keeping of records of when and how much pesticide product was applied, among other things. VDACS works cooperatively with the U.S. Environmental Protection Agency to insure that applicators of Restricted Use Pesticides (RUPs) are properly certified, and that all pesticides are used and handled according to label directions. VDACS works with the U.S. Department of Agriculture to insure that growers maintain adequate records of their RUP applications. Under a federal rule, the Worker Protection Standard, greater record-keeping is also required on farms where 10 or more farm workers are employed. VDACS enforces these rules, and VCE helps develop the educational programs and materials to train farmers.

Pesticide Storage and Handling - VDACS, VCE

Farmers and any other users of pesticides are prohibited from handling, transporting, storing or distributing any pesticide in a manner that may endanger humans, the environment, food or feed. In addition, pesticide labels often contain specific instructions regarding storage and handling of the product. No pesticide user, whether farmer, commercial applicator or other, may use a pesticide in a manner inconsistent with the label. Virginia regulation requires that pesticide application equipment be properly

calibrated to prevent over-application. These regulations also require the use of back-flow preventers to protect water supply systems, wells, streams and lakes. VDACS enforces these requirements, and VCE develops educational programs (e.g., for those studying for certification) for pesticide users' awareness.

Poultry Waste Permits - DEQ, DCR (§62.1-44.17:1.1 *Code of Virginia*)

Beginning in 2001, poultry operations with at least 200 animal units (20,000 broilers or 11,000 turkeys) will be required to operate in compliance with a poultry waste permit. The permits will require producers to implement DCR-approved nutrient management plans, proper waste storage methods, and waste tracking and accounting procedures. Regulations are currently under development.

Precision Nutrient and Pesticide Application Equipment Tax Credit - DCR (§58.1-337 and §58.1-436 *Code of Virginia*)

This incentive program provides a 25 per cent state income tax credit up to $3,750 annually to encourage farmers to purchase more accurate nutrient and pesticide application equipment which meets state specifications. Eligible equipment categories include: manure spreaders, pneumatic fertilizer applicators, sprayers for pesticides or liquid fertilizers, tramline equipment, and starter fertilizer attachments for planters. The program also requires the farmer to have a nutrient management plan.

Rotational Grazing/Livestock Exclusions - VCE, NRCS

This educational program promotes the use of intensive grazing with beef and sheep producers. When implemented on the farm, this program is intended to reduce erosion, to fence cattle out of nearby streams and to reduce inorganic nutrient inputs into the waterway. Currently, this is a cost-shared practice under the Virginia cost-share program. NRCS also promotes this program in its conservation outreach efforts.

Rotational Loafing Lot Management - VCE, NRCS

Virginia Cooperative Extension promotes this cost-shared BMP in its educational programs, with NRCS providing the technical expertise for the practice. This practice allows dairy farmers to rotate their cow herd from paddock to paddock during the loafing times between milkings. This practice results in the exclusion of cattle from streams, reducing erosion and polluted runoff and a more efficient milking system for the dairy farmer since the cows are cleaner. This BMP is an important part of the tributary strategies associated with cleaning up the Chesapeake Bay.

Virginia Pollution Abatement (VPA) Animal Waste Permits - DEQ, DCR (§62.1-44.17:1 *Code of Virginia*, 9 VAC 25-32-10)

Virginia Pollution Abatement (VPA) permits are regulatory in nature and are issued by DEQ for activities that manage wastes, which could impact state water quality but do not discharge directly to surface waters. VPA permits are issued for animal feeding operations with 300 or more animal units. This impacts agricultural operations having at least 300 beef cattle, 200 dairy cattle or 750 swine weighing more than 55 pounds in confinement. Smaller operations may be required to obtain a permit if they are known to cause water pollution. VPA permits address management of wastewater, runoff from storm events and solids/sludges so there is no point source discharge of pollutants to surface waters under all conditions up to and including the 25-year, 24-hour storm event. Permit restrictions and requirements may include ground water monitoring. These permits require an enforceable, site-specific DCR-approved nutrient management plan to address proper waste storage, rate of waste application and timing of application. The permit term maximum is 10 years, however nutrient management plans required by the permits must be revised every three years. Regulated farms are inspected at least annually. In addition to complying with all conditions of the permits, producers must attend training sessions at least once every three years. Pathogens are addressed through controls on waste storage and land application to prevent runoff.

Virginia Pollution Abatement (VPA) Industrial Waste Land Application Permits - DEQ
(§62.1-44.15 *Code of Virginia*, 9 VAC 25-32-10 et. seq.)

This type of pollutant management activity typically involves land application of industrial waste to crop land or forest land. The rate of industrial waste application is determined by the amount of nutrients or toxic materials present based on the most restrictive constituent in the

waste, soil type, and the crop to be grown on the site. Nutrients are applied at agronomic rates.

Virginia Pollutant Discharge Elimination System Permits (VPDES) - DEQ
(§62.1-44.15 *Code of Virginia*, 9 VAC 25-31-10 et. seq.)

VPDES permits are regulatory controls on point source discharges of pollutants to surface waters. When a municipal sewage treatment plant chooses to be responsible for the use and disposal of its sewage sludge/biosolids, the VPDES permit contains conditions regulating that activity. Sludge management plans in VPDES permits regulate the rate at which sludge can be land applied to crop land based on both the nutrient content of the sludge and the amount of heavy metals it contains. Nutrients are applied at agronomic rates. Treatment for pathogen control is also addressed in the sludge management plan. The metals and pathogen controls conform to those in the federal 40 CFR Part 503 Sludge Use and Disposal Regulation.

Virginia Revolving Loan Fund - DEQ
(§62.1-229.1 *Code of Virginia*)

Agricultural BMPs will be eligible for funding under the Virginia Revolving Loan Fund. The 1999 General Assembly passed legislation allowing DEQ to provide loans to address NPS pollution from agricultural activities.

DEQ will prioritize applications for loan assistance on a statewide basis. Applications for practices that are expected to provide the greatest water quality benefit will be given the highest funding priority. Applications considered to impact segments on the 303(d) Impaired Waters List will receive high priority. Those impacting waters on the 305(b) Threatened List, DCR high priority waters, or the Nutrient Enriched Waters List will receive a medium priority rating. All other applicants will be given lower priority.

Water Well Testing Program - VCE

This is an educational program that teaches rural homeowners about potential pollution problems that may be associated with their home water supply. Local extension agents coordinate the program and provide educational information to rural homeowners on safety issues dealing with their home water supply that comes from ground water.

Wetland Reserve Program (WRP) - NRCS, FSA

This voluntary program is designed to restore and protect wetlands on private property. The program includes financial assistance to enhance wetland and financial incentives to sell a conservation easement to USDA. The landowner retains ownership, but agrees to limit future use of the land.

Wildlife Habitat Incentives Program (WHIP) - NRCS, FSA, DGIF

This is a voluntary program to provide technical and financial assistance to develop and enhance habitat for upland wildlife, wetland wildlife, threatened and endangered species, fish and other types of wildlife.

Karst Groundwater Program
This program provides technical assistance to landowners, SWCDs, and agencies on NPS problems associated with karst subsidence, habitat management, and groundwater quality and quantity.

ASSESSMENT OF EXISTING PROGRAMS ADDRESSING POLLUTANTS IN EACH SOURCE SUBCATEGORY

N = Nutrients S = Sediments T = Toxics P = Pathogens

Existing Program	Confined Animal Feeding Operations	Livestock on Pasture	Field Crops	Vegetables	Orchards & Vineyards	Nurseries and Ornamentals
Ag BMP Tax Credit - DCR, SWCDs	N, S, T, P	N, S, T, P	N, S, T, P	N, S, T, P	N, S, T, P	N, S, T, P
Ag BMP Cost-Share Program - DCR, SWCDs	N, S, P	N, S, P	N, S	N, S		
Agricultural Stewardship Act - VDACS, SWCDs	N, S, T	N, S, T	N, S, T	N, S, T	N, S, T	N, S, T
Animal Disease Control and Prevention - VDACS	P	P				
Biosolids Use Regulations - VDH		N, P	N, P			

Chesapeake Bay Pres. Act - CBLAD, SWCDs		N, S, T	N, S, T	N, S, T	N, S,
Conservation Reserve Program - NRCS, FSA			N, S, T	N, S, T	
NPS Education - VCE, SWCDs	N, S, T, P	N, S, T, P	N, S, T	N, S, T	T
Environmental Quality Incentives Program (EQIP) - NRCS, FSA	N, S, P	S	S		
Farm*A*Syst - VCE	N, S, T, P	N, S, T, P	N, S, T	N, S, T	N, S,
Food Security Act/Conservation Compliance - NRCS, FSA			S		
Ground Water Withdrawal Regulations - DEQ	N, T, P		N, S, T	N, S, T	
Integrated Pest Mgt. (IPM) Implementation - VCE		T	T	T	T
Irrigation Water Management - VCE			N, S, T	N, S, T	
Land Use Assessment - VDACS		S	S	S	S
Noxious Pest Prevention - VDACS		T	T	T	T
Nursery Inspection Program - VDACS					

Existing Program	Confined Animal Feeding Operations	Livestock on Pasture	Field Crops	Vegetables	Orch Vine
Nutrient Management Program - DCR	N	N	N	N	N
Nutrient Mgt. Training & Certification - DCR	N	N	N	N	
Pesticide Record Keeping - VDACS, VCE	T	T	T	T	T
Pesticide Storage/Handling - VDACS, VCE	T	T	T	T	T
Pesticide Applicator Certification -VDACS,VCE	T	T	T	T	T
Pesticide Clean Days - VDACS, VCE	T	T	T	T	T
Pesticide Container Recycling - VDACS, VCE	T	T	T	T	T
Poultry Waste Permits - DEQ, DCR	N, P				
Precision Nutrient and Pesticide Application Equipment Tax Credit - DCR, SWCDs	N, T	N, T	N, T	N, T	N, T
NPS Research - VPI&SU, VSU, DCR	N, S, T, P	N, S, T, P	N, S, T, P	N, S, T, P	N, S,
Rotational Loafing Lot Mgt. - NRCS, VCE	N, S, P				
Rotational Grazing - NRCS, VCE		S			
Virginia Revolving Loan Fund - DEQ	N, S, T, P	N, S, T, P	N, S, T, P	N, S, T, P	N, S,

VPA Industrial Waste Land App. Permits - DEQ		N, P, T	N, P, T		
VPA Animal Waste Permits - DEQ, DCR	N, P				
VPDES Sewage Sludge Permits - DEQ		N, P	N, P		
Water Well Testing Program - VCE	P	P			
Wetland Reserve Program (WRP) NRCS, FSA		N, S, T	N, S, T	N, S, T	N, S,
Wildlife Habitat Incentives Program (WHIP) - NRCS, FSA			S	S	S

OBJECTIVES (SHORT-TERM GOALS)

The agriculture work group identified nine objectives (short-term goals) to support and implement the five long-term goals. Strategies and tasks were formulated by agency representatives and target dates were set in order to achieve a successful NPS pollution management approach for agriculture. The objectives are listed below and detailed in the tables that follow. (For additional strategies, objectives, and tasks regarding implementation of agriculture management measures in the coastal zone refer to Chapter XIII Coastal Nonpoint Source Pollution Control Program.)

Objective 1. Provide assistance to producers to ensure that farms accounting for 60 per cent of the state's total number of beef, dairy and swine animals in confinement will have adequate waste management systems and nutrient management plans by 2004

Objective 2. Provide assistance to ensure that poultry farms with 200 or more animal units will implement nitrogen-based and phosphorus-based nutrient management plans, proper waste storage practices, and waste tracking and accounting procedures by 2004

Objective 3. Provide assistance to farmers to ensure that controlled stream access practices will be installed on 30 per cent of livestock grazing operations for stream segments where pathogens, sediment, or nutrients from grazing livestock are contributing to an impairment by 2004

Objective 4. Ninety percent (90 per cent) of highly erodible cropland will be managed in accordance with NRCS conservation plans in watersheds where agricultural sediment is contributing to an impairment, or as necessary where basin management plans identify specific sediment reduction goals, by 2004

Objective 5. By 2004, nutrient management plans will be developed as required where basin management plans identify specific agricultural nutrient reduction targets

Objective 6. Agricultural sources of toxics will be controlled by maintaining and implementing IPM and pesticide management programs and regulations to protect ground and surface water quality statewide, and to minimize effects on human and wildlife populations

Objective 7. Sixty percent (60 per cent) of farm acreage in irrigated cropland will implement improved irrigation scheduling practices by 2004

Objective 8. Thirty percent (30 per cent) of production facilities in the container nursery and greenhouse industry will use containment systems to trap sediment and recycle nutrients or implement BMPs of equivalent effectiveness by 2004

Objective 9. Technical and administrative program capabilities will be enhanced to address potential pollution concerns originating from confined animal feeding operations, livestock grazing, cropland management, and nursery and ornamental operations through 2004

TABLES OF OBJECTIVES & STRATEGIES

Goal 1 - Confined Animal Feeding Operations

Maintain existing beneficial uses in unimpaired state waters and restore beneficial uses in surface waters where confined animal feeding operations are contributing to a water quality impairment caused by sediment, nutrients or pathogens as listed in the 303d TMDL Priority List Report, or where ground water contaminants originating from confined animal feeding operations exceed the state ground water standard, by 2014

OBJECTIVE 1			
Provide assistance to producers to ensure that farms accounting for 60 per cent of the state's total number of beef, dairy and swine animals in confinement will have adequate waste management systems and nutrient management plans by 2004			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
1.1 Provide nutrient analysis for 500 manure samples annually to support the nutrient management program	•DCR	Annual	•Bay Imp Grant •319 Grant
1.2 If voluntary measures are not successful in meeting beneficial uses, VPA permits will be issued to operations with fewer than 300 animal units of beef, dairy or swine that contribute to a water quality impairment	•DEQ •DCR	Ongoing	•General Fund

1.3 Mandatory training sessions for VPA animal waste general permit registrants will be given	•DCR •VPI&SU •DEQ	Ongoing	•General Fund
1.4 The DEQ animal waste permit inspection staff and the DCR nutrient management staff will meet at least annually to discuss technical and administrative procedures related to VPA permits	•DEQ •DCR	Annual	•General Fund
1.5 Animal waste management systems will be installed on 70 farms annually through the Agricultural BMP Cost-share program	•DCR •SWCDs	Ongoing	•General Fund •Bay Imp Grant
1.6 State and federal grant funds will be utilized to encourage innovative projects capable of NPS pollution abatement, such as feed management strategies to reduce livestock nutrient excretion	•DCR	•Ongoing	•General Fund •WQIA •Bay Imp Grant •319 Grant

OBJECTIVE 1 (Cont.)			
Provide assistance to producers to ensure that farms accounting for 60 per cent of the state's total number of beef, dairy and swine animals in confinement will have adequate waste management systems and nutrient management plans by 2004			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
1.7 Agricultural Stewardship Act complaints will be investigated and corrective action taken on all founded complaints to address pollution problems	•VDACS •SWCDs	Ongoing	•General Fund
1.8 Evaluate potential incentive programs to assist producers in the transition to phosphorus based nutrient management plans for non-poultry operations, such as encouraging new techniques for waste management	•DCR •VDACS •DEQ •VCE	Ongoing	•Unknown
1.9 Participate in research addressing airborne ammonia at confined animal feeding operations as a member of Mid Atlantic Regional Air Management Association	•DEQ	Ongoing	•EPA

1.10 The DCR cost-share program for regulated farms will be evaluated for potential revision in view of the transition from primarily a voluntary based agricultural NPS programs toward more regulatory programs and the increased available funding	•DCR	2000	•General Fund •Bay Imp Grant
1.11 Virginia Pollution Abatement (VPA) permits will be issued for farms with 300 or more animal units of beef, dairy or swine in confinement	•DEQ •DCR	2000	•General Fund
1.12 A phosphorus site index which considers phosphorus soil test levels and runoff characteristics of fields will be developed	•DCR •VPI&SU	2003	•Bay Imp Grant
1.13 Nutrient management training and certification regulations will be revised to reflect technology available to date	•DCR	2003	•State Training & Cert. Fund
1.14 New and newly revised voluntary or regulatory nutrient management plans will incorporate the use of phosphorus management practices	•DCR	2004	•General Fund

OBJECTIVE 2			
Provide assistance to ensure that poultry farms with 200 or more animal units will implement nitrogen-based and phosphorus-based nutrient management plans, proper waste storage practices, and waste tracking and accounting procedures by 2004			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
2.1 Provide nutrient analysis for 500 manure samples annually to support the nutrient management program	•DCR	Ongoing	•Bay Imp Grant •319 Grant
2.2 Mortality composters will be installed on a minimum of 30 farms annually through the Virginia Agricultural BMP Cost-Share Program	•DCR •SWCDs	Ongoing	•General Fund •Bay Imp Grant

2.3 State and federal grant funds will be utilized to encourage innovative projects capable of NPS pollution abatement	•DCR	Ongoing	•General Fund •WQIF •Bay Imp Grant •319 Grant
2.4 The DCR cost-share program for regulated farms will be evaluated for potential revision in view of the transition from primarily a voluntary based agricultural NPS programs toward more regulatory programs and the increased available funding	•DCR	2000	•General Fund •Bay Imp Grant
2.5 Poultry waste regulations stipulating proper waste storage, nutrient management, and waste tracking and accounting requirements will be promulgated	•DEQ	2000	•General Fund
2.6 The nutrient management plan computer software will be upgraded to enable phosphorus-based nutrient management plans and software will be supported for public/private sector planners	•VPI&SU	2000 support ongoing 2001-2004	•Bay Imp Grant
2.7 A poultry litter transport and/or alternative use cost-share program will be presented to the Virginia General Assembly	•DCR •VDACS •DEQ •VPI&SU	2001	•General Fund

OBJECTIVE 2 (Cont.)			
Provide assistance to ensure that poultry farms with 200 or more animal units will implement nitrogen-based and phosphorus-based nutrient management plans, proper waste storage practices, and waste tracking and accounting procedures by 2004			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
2.8 Regulated poultry farms (approximately 1,100 farms) will comply with the poultry waste regulations including nitrogen based nutrient management plans	•DEQ •DCR	2001	•General Fund

2.9 New poultry facilities or revised nutrient management plans for existing facilities will be required to be developed on a nitrogen and phosphorus basis after 10/1/01 with all existing poultry plans converted by 10/1/04	•DCR	Ongoing 2001-2004	•General Fund
2.10 Poultry litter land application research and the water quality impacts from poultry litter will be evaluated and nutrient management plan regulations revised as needed	•DCR	2004	•General Fund

Goal 2 - Livestock Grazing

Maintain existing beneficial uses in unimpaired state waters and restore beneficial uses in surface waters where livestock grazing operations are contributing to a water quality impairment caused by sediment, nutrients or pathogens as listed in the 303d TMDL Priority List Report, or where ground water contaminants originating from livestock grazing operations exceed the state ground water standard, by 2014

OBJECTIVE 3
Provide assistance to farmers to ensure that controlled stream access practices will be installed on 30 per cent of livestock grazing operations for stream segments where pathogens, sediment or nutrients from grazing livestock are contributing to an impairment by 2004

STRATEGIES & RELATED TASKS	AGENCIES & OTHERS	TARGET YEAR	FUNDING SOURCES
3.1 Technical assistance will be provided to livestock producers to limit access of livestock to streams, rivers, lakes and other water bodies with targeting of assistance to impaired waters	•NRCS •SWCDs •VCE •DGIF	Ongoing	•USDA Federal appropri-ations •General Fund
3.2 Cost-share assistance for BMPs will be provided to livestock producers to limit access of livestock to streams, rivers, lakes and other water bodies with targeting of assistance to impaired waters	•FSA •DCR •SWCDs	Ongoing	•USDA Federal appropri-ations •General Fund •Bay Imp Grant
3.3 The Conservation Reserve Enhancement Program (CREP) will provide enhanced cost-share rates for BMP installation and increased rental payments to enroll up to 35,000 acres in riparian buffers	•DCR •FSA •DOF •VCE	2004	•General Fund
3.4 Ten farmer educational meetings to promote limited stream access, alternative watering sources and related practices will be held annually	•VCE •DGIF	Ongoing	•General Fund •Bay Imp Grant •319 Grant
3.5 Agricultural Stewardship Act complaints will be investigated and corrective action taken on all founded complaints to address pollution problems	•VDACS •SWCDs	Ongoing	•General Fund

OBJECTIVE 3 (Cont.)			
Provide assistance to farmers to ensure that controlled stream access practices will be installed on 30 per cent of livestock grazing operations for stream segments where pathogens, sediment or nutrients from grazing livestock are contributing to an impairment by 2004			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**

3.6 Use of DNA and other identification techniques to identify sources of impairments will be evaluated	•DCR •VPI&SU •VSU •JMU	Ongoing	•TMDL Funds •Bay Imp Grant •319 Grant
3.7 Conservation plans will be developed on 96,000 acres of pasture annually	•NRCS	Ongoing	•USDA Federal appropri-ations
3.8 The Environmental Quality Incentives program (EQIP) will target cost-share assistance to priority watersheds where uncontrolled livestock access to streams has impaired water quality	•NRCS •FSA	Ongoing	•USDA Federal appropr-iations
3.9 Agencies will coordinate with local farm interest groups to encourage greater outreach and BMP implementation where livestock grazing operations contribute to a water quality impairment	•DCR •DEQ •VCE •DGIF	Ongoing	•General Fund •Bay Imp Grant •319 Grant

Goal 3 - Cropland Management (includes field crops, vegetables, orchards and vineyards)

Agricultural cropland will be managed in ways which maintain or restore beneficial uses in surface waters and protect water quality in ground water by controlling losses of sediment to surface waters and losses of nutrients and toxics to ground and surface waters by 2014

OBJECTIVE 4			
Ninety percent (90 per cent) of highly erodible cropland will be managed in accordance with NRCS conservation plans in watersheds where agricultural sediment is contributing to an impairment, or as necessary where basin management plans identify specific sediment reduction goals, by 2004			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
4.1 Conservation plans will be developed on 96,000 acres annually	•NRCS •CBLAD	Ongoing	•USDA Federal appropri-ations •General Fund
4.2 Approximately 7,000 acres annually will be enrolled in the Conservation Reserve Program (CRP)	•FSA •NRCS	Ongoing	•USDA Federal appropri-ations
4.3 Sites will be evaluated for compliance with Chesapeake Bay Preservation Act requirements on 35,000 acres annually	•CBLAD •SWCDs	Ongoing	•General Fund
4.4 Technologies which promote and encourage greater use of conservation tillage will be integrated into 30 farmer workshops annually	•VCE	Ongoing	•General Fund
4.5 Agricultural Stewardship Act complaints will be investigated and corrective action taken on all founded complaints to address pollution problems	•VDACS •SWCDs	Ongoing	•General Fund

4.6 Projects to develop or evaluate BMPs which may reduce NPS impacts from plasticulture will be solicited	•DCR	2001	•General Fund •WQIF •Bay Imp Grant •319 Grant •CZARA

OBJECTIVE 4 (Cont.)			
Ninety percent (90 per cent) of highly erodible cropland will be managed in accordance with an NRCS conservation plan in watersheds where agricultural sediment is contributing to an impairment, or as necessary where basin management plans identify specific sediment reduction goals, by 2004			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
4.7 Conservation plans on highly erodible land (HEL) cropland will be maintained and updated as needed in order for producers to maintain eligibility for USDA Federal appropriations program benefits	•NRCS	Ongoing	•USDA Federal appropri-ations

OBJECTIVE 5			
Nutrient management plans will be developed as required where basin management plans identify specific agricultural nutrient reduction targets by 2004			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
5.1 Nutrient management plans will be developed or revised on 60,000 acres annually	•DCR •SWCDs •VCE	Ongoing	•Bay Imp Grant •319 Grant •General Fund
5.2 Biosolids Use permits will be issued and enforced	•VDH	Ongoing	•General Fund

5.3 Cereal grain cover crops will be enrolled on 1,000 acres annually through the Agricultural BMP Cost-Share Program	•DCR •SWCDs	Ongoing	•General Fund •Bay Imp Grant
5.4 Agricultural Stewardship Act complaints will be investigated and corrective action taken on all founded complaints to address pollution problems	•VDACS •SWCDs	Ongoing	•General Fund
5.5 Virginia Tech will offer no-cost soil analysis for commercial farms contingent on adequate biannual appropriations from the General Assembly	•VPI&SU	Ongoing	•General Fund

OBJECTIVE 5 (Cont.)			
Nutrient management plans will be developed as required where basin management plans identify specific agricultural nutrient reduction targets by 2004			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
5.6 Expansion of nutrient management plan development, cost-share and implementation incentives will be evaluated for coverage into the lower bay tributaries and statewide	•DCR	2000	•General Fund •Bay Imp Grant
5.7 The Nutrient Management Handbook will be revised to reflect technology available to date and to eliminate duplicate material contained in companion documents	•DCR	2001	•319 Grant
5.8 Biosolids Use Regulations will be revised to include revised criteria for temporary on-site covered storage and nutrient management plans	•VDH •DCR	2001	•General Fund
5.9 Nutrient management plans will be required for all new or reissued VPDES and VPA permitted activities involving land application of sewage sludge or industrial waste containing nitrogen and phosphorus	•DEQ •DCR	2001	•Bay Imp Grant •319 Grant •General Fund

5.10 Nutrient management training and certification regulations will be revised to reflect technology available to date	•DCR	2004	•State Training and Certification Fund
5.11 Phosphorus management requirements will be incorporated into Biosolids Use permits, VPDES sludge permits, and VPA Industrial Waste Permits that authorize nutrient application to cropland	•VDH •DEQ •DCR	2004	•General Fund

OBJECTIVE 6			
Agricultural sources of toxics will be controlled by maintaining and implementing IPM and pesticide management programs and regulations to protect ground and surface water quality statewide, and to minimize effects on human and wildlife populations			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
6.1 Pesticide Clean Days to collect and dispose of unwanted pesticides will continue on a county-by-county or regional basis as needs and funding dictate	•VDACS •VCE	Ongoing	•General Fund •FIFRA •319 Grant
6.2 IPM concepts will be incorporated as part of the pesticide licensing and certification requirements and will continue to be integrated into recertification educational training sessions	•VDACS •VCE	Ongoing	•General Fund •FIFRA •USDA
6.3 Agricultural Stewardship Act complaints will be investigated and corrective action taken on all founded complaints to address pollution problems	•VDACS •SWCDs	Ongoing	•General Fund
6.4 Applied research will continue, utilizing IPM concepts that can be incorporated into farming operations resulting in improved implementation of IPM on farms	•VPI&SU •VSU	Ongoing	•Unknown
6.5 Field days, demonstrations, workshops and test plots will be utilized to teach and promote the use of IPM with the agriculture industry	•VCE	Ongoing	•General Fund

6.6 Request funding to reinstate a beneficial insect breeding and distribution program	•VDACS	2001	•General Fund

OBJECTIVE 7			
Sixty percent (60 per cent) of farm acreage in irrigated cropland will implement improved irrigation scheduling practices by 2004			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
7.1 A publication will be developed and series of farmers workshops held on proper irrigation scheduling techniques	•VPI&SU	2000	•CZARA
7.2 Guidance will be developed for water conservation and management plans as required in ground water withdrawal permits	•DEQ	2001	•General Fund

Goal 4 -Nursery and Ornamentals Management

Commercial nursery and ornamental operations will be managed in ways which maintain or restore beneficial uses in surface waters and water quality in ground water by controlling losses of sediment to surface waters and losses of nutrients and toxics to ground and surface waters by 2014

OBJECTIVE 8			
Thirty percent (30 per cent) of production facilities in the container nursery and greenhouse industry will use containment systems to trap sediment and recycle nutrients or implement BMPs of equivalent effectiveness by 2004			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
8.1 Develop and recommend potential container nursery and greenhouse runoff containment and recycling BMPs for inclusion into the Virginia Agricultural BMP Cost-Share Program	•DCR	2000	•Unknown
8.2 Develop guidelines for nutrient management plans and soil and water quality conservation plans for container nursery and greenhouse operations	•DCR •CBLAD •DEQ •VCE	2000	•Unknown

8.3 Conduct a monitoring study of water quality in areas adjacent to container nursery and greenhouse operations	•DEQ	2000-2002	•General Fund •319 Grants
8.4 Incorporate container nursery and greenhouse runoff containment and recycling BMPs as an eligible practice for existing operations in the Virginia Agricultural BMP Cost-Share Program	•DCR	2001	•General Fund • Bay Imp Grant
8.5 Evaluate the need to develop additional programs to address pollutants contained in container nursery and greenhouse runoff and leachate	•DEQ •DCR •CBLAD	2003	•Unknown

Goal 5 - Agricultural NPS Pollution Program Development

Continue to develop and implement agricultural nonpoint source (NPS) programs to effectively prevent and reduce pollution in ground and surface waters through 2014

OBJECTIVE 9			
Technical and administrative program capabilities will be enhanced to address potential pollution concerns originating from confined animal feeding operations, livestock grazing, cropland management, and nursery and ornamental operations through 2004			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
9.1 Applied research projects which are expected to develop new techniques which can reduce the potential for nonpoint source pollution from agricultural sources, or which are expected to result in more accurate estimation techniques for BMP effectiveness as compared to current techniques, will be encouraged and funding mechanisms explored	•DCR •VPI&SU •VSU	Ongoing	•General Fund •Bay Imp Grant

9.2 Training sessions utilizing case studies concerning the Agricultural Stewardship Act will be held annually for SWCD employees	•VDACS	Ongoing	•General Fund
9.3 Periodic coordination meetings will be held between VDACS, DCR, and DEQ staff at the regional level to resolve common issues regarding agricultural pollution complaints	•VDACS •DEQ •DCR	Ongoing	•General Fund
9.4 An interagency task force will be convened to evaluate technical assistance needs to implement NPS strategies	•DCR •NRCS •SWCDs •VDACS •CBLAD	2001	•Unknown
9.5 A water quality monitoring project will continue in Mossy and Glade creeks to verify agricultural loadings for the bay watershed model	•DCR •VPI&SU	2000 2001	•Bay Imp Grant

OBJECTIVE 9 (Cont.)			
Technical and administrative program capabilities will be enhanced to address potential pollution concerns originating from confined animal feeding operations, livestock grazing, cropland management, and nursery and ornamental operations through 2004			
STRATEGIES & RELATED TASKS	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**

9.6 The Virginia portion of the national cooperative soil survey will complete the inventory of Virginia's soil resources (field mapping) 	•DCR •NRCS •VPI&SU	2000: Bath, Buckingham, Patrick Counties 2001: Franklin 2002: Floyd Russell Scott Sussex 2003: Halifax 2004: mapping in progress in all remaining counties (Bland, Brunswick, Buchanan, Craig, Dickerson, Highland, and Wise)	•General Fund •USDA Federal appropriations
9.7 Revised water quality standards for ground water will be proposed	•DEQ	2004	•General Fund
9.8 Incorporate revised ground water protection measures into state guidance documents for voluntary, incentive-based and regulatory programs	•DEQ •DCR •VDACS •CBLAD •NRCS	2004	•General Fund •Bay Imp Grant •319 Grant
9.9 The agricultural chapter of the NPS Management Plan will be revised every five years	• NPSAC Agencies	2004	•319 Grant

WORK GROUP MEMBERS & AGENCY/ORGANIZATION REPRESENTED

Agriculture

Department of Conservation & Recreation Facilitator
Mr. Russ Perkinson
Nonpoint Source Planning & Grants Program Manager
Mr. Rick Hill

Ms. Jody Aston
Department of Conservation & Recreation

Dr. Asmare Atalay
Virginia Cooperative Extension/Virginia State University

Mr. Dana Bayless
Department of Conservation & Recreation

Mr. Matt Bley
Department of Conservation & Recreation

Mr. Ken Carter
Natural Resources Conservation Service

Ms. Debbie Cross
Department of Conservation & Recreation

Mr. Mike Foreman
Department of Forestry

Ms. Linda Hagenau
The Environmental Interest Organization

Mr. Samuel Hamilton
Virginia Agribusiness Council

Ms. Ann Jennings
Chesapeake Bay Foundation

Mr. Larry Land
Virginia Association of Counties

Ms. Marilyn Layer
Virginia Association of Soil & Water Conservation Districts

Mr. Richard Ayers
Department of Environmental Quality

Mr. Victor Liu
Crater Planning District Commission

Ms. Mary Ann Massie
Department of Environmental Quality

Mr. Tim Maupin
Rocco

Ms. Sarah Pugh/Mr. Hunter Richardson
Virginia Department of Agriculture & Consumer Services

Ms. Donna Pugh-Johnson
Virginia Agribusiness Council

Dr. Willy Reay
Virginia Institute of Marine Science

Mr. David Sausville, Jr.
Ducks Unlimited, Inc.

Mr. Cal Sawyer
Virginia Department of Health

Mr. Randy Shank
Virginia Cooperative Extension

Ms. Kay Slaughter
Southern Environmental Law Center

Mr. Mark Slauter
Department of Conservation & Recreation

Mr. Dan Solomon
Natural Resources Conservation Service

Mr. Wilmer Stoneman
Virginia Farm Bureau Federation

Mr. Eric Walberg
Hampton Roads Planning District Commission

Mr. Billy Wayson
Virginia Forage and Grassland Council

Mr. Stuart Wilson
Department of Conservation and Recreation

Mr. Ron Wood
Chesapeake Bay Local Assistance Department